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# *Cardamine lojanensis* (Brassicaceae), a New Species from Ecuador

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**ABSTRACT.** *Cardamine lojanensis*, a new Ecuadorian species from Loja Province, is described and illustrated. Its relationship to the nearest South American species is discussed.

During preparation of the Brassicaceae for the Catalogue of the Vascular Plants of Ecuador, a loan of *Cardamine* from AAU was studied. It included four specimens of a species that did not match any of the known South American members. The new species, *C. lojanensis*, is named after Loja Province, from which it was collected.

***Cardamine lojanensis*** Al-Shehbaz, sp. nov.

TYPE: Ecuador. Prov. Loja: Parque Nacional Podocarpus, Cerro Toledo E of Yangana, wet paramo around radio station, 3400–3450 m, 79°6'W, 4°24'S, 26 Feb. 1985, B. Øllgaard, S. Laegaard, K. Thomsen, K. Korning & T. Illum 58147 (holotype, AAU). Figure 1.

Herba perenna, rhizoma tuberosa squamosa; folia basalia pinnata, petiolis ad basem complanatis triangularibus persistentibus, petiolis rhachibus equali vel duplo longioribus; foliola 6–11-jugata, petiolulata, pinnatifida, laciniata, vel incisa, foliolium terminale foliolis lateralibus similis, cilia 0.06–0.12 mm longae; folia caulina 2–6, forma foliis basalibus similia, rhachidibus petiolis duplo vel quadruplo longioribus; sepala oblonga, glabra, 3–4 mm longa; petala alba, late obovata vel suborbiculata, 8–11 mm longa, 6–7 mm lata, subtruncata vel subemarginata, apiculata, minute unguiculata; pedicelli fructiferi recti, striati, basales 2–2.5 cm longi; fructus linearis, stipitatus, 2.5–5 cm longus; stylus 3–4 mm longus.

Herbs perennial. Rhizomes tuberous, scaly, with persistent expanded petiolar bases of previous years. Stems 1 or 2, erect, somewhat striate, glabrous or rarely sparsely minutely hairy. Basal leaves compound, with 13–23 leaflets; petiole 1.5–6 cm long, 1–2× as long as leaf rachis, distinctly expanded into a triangular, winged, persistent base that becomes scalelike in subsequent seasons; rachis grooved, 0.7–3 cm long; leaflets petiolulate, ovate to ovate-oblong in outline, 2–11 mm long, 1–7 mm wide, pinnatifid, laciniate, to incised, the segments usually incised to dentate, margin sparsely ciliate with minute trichomes 0.06–0.12 mm long, apex acute, terminal segment as large as lateral ones; petiolule grooved, (0.5–)1–3 mm long.

Cauline leaves 2–6, with 13–19 leaflets, similar in morphology to basal leaves, reduced in size and degree of leaflet division upward; petiole 0.7–1.2 cm long; rachis 2–4× as long as petiole; leaflets short petiolulate or sessile in uppermost leaves. Inflorescences corymbose racemes, elongated considerably in fruit, lowermost few flowers bracteate; bract usually adnate to pedicel, lowermost pinnatifid to pinnatisect. Sepals oblong, 3–4 mm long, 1.2–1.5 mm wide, slightly saccate, erect or suberect, caducous after anthesis, glabrous, scarious at margin and apex. Petals white, broadly obovate to suborbicular, 8–11 mm long, 6–7 mm wide, abruptly narrowed into a clawlike base to 1 mm long, apex shallowly subemarginate to subtruncate and with a minute apicula. Stamens conspicuously tetradynamous, erect; filaments white, median pairs 4–5 mm long, lateral pair 3–3.5 mm long; anthers oblong, ca. 1 mm long. Nectar glands confluent, well developed into 2 median teeth and 4 lateral teeth, lateral teeth 1 on each side of a lateral stamen. Fruiting pedicels ascending, straight, glabrous, striate, lowermost 2–2.5 cm long, gradually shorter upward. Fruit linear, 2.5–5 cm long, ca. 2 mm wide, on a gynophore to 1 mm long; style 3–4 mm long; stigma discoid, slightly wider than style. Seeds brown, oblong, ca. 2.4 × 1.2 mm.

*Distribution and habitat.* In wet paramo, upper montane forests, scrubby subparamo, and heath and chaparral vegetation in Parque Nacional Podocarpus, Loja Province, at 3000–3450 m.

*Cardamine lojanensis* is readily distinguished from all of the tuberous South American species by its pinnately compound basal leaves with 6–11 pairs of petiolulate lateral leaflets. All of the other South American tuberous species of *Cardamine* (*C. garavaentae* O. E. Schulz, *C. hispidula* Philippi, *C. macrostachya* Philippi, *C. tuberosa* DC., *C. valdiviana* Philippi, *C. variabilis* Philippi, and *C. vulgaris* Philippi), which are distributed exclusively in Chile and Argentina, have simple, trifoliolate, or rarely pinnately compound basal leaves with 2–4 pairs of sessile lateral leaflets. Furthermore, the tuberous rhizomes in these species are not scaly and the bracts are not adnate to pedicels, whereas in *C. lojanensis* the rhizomes are scaly and the bracts



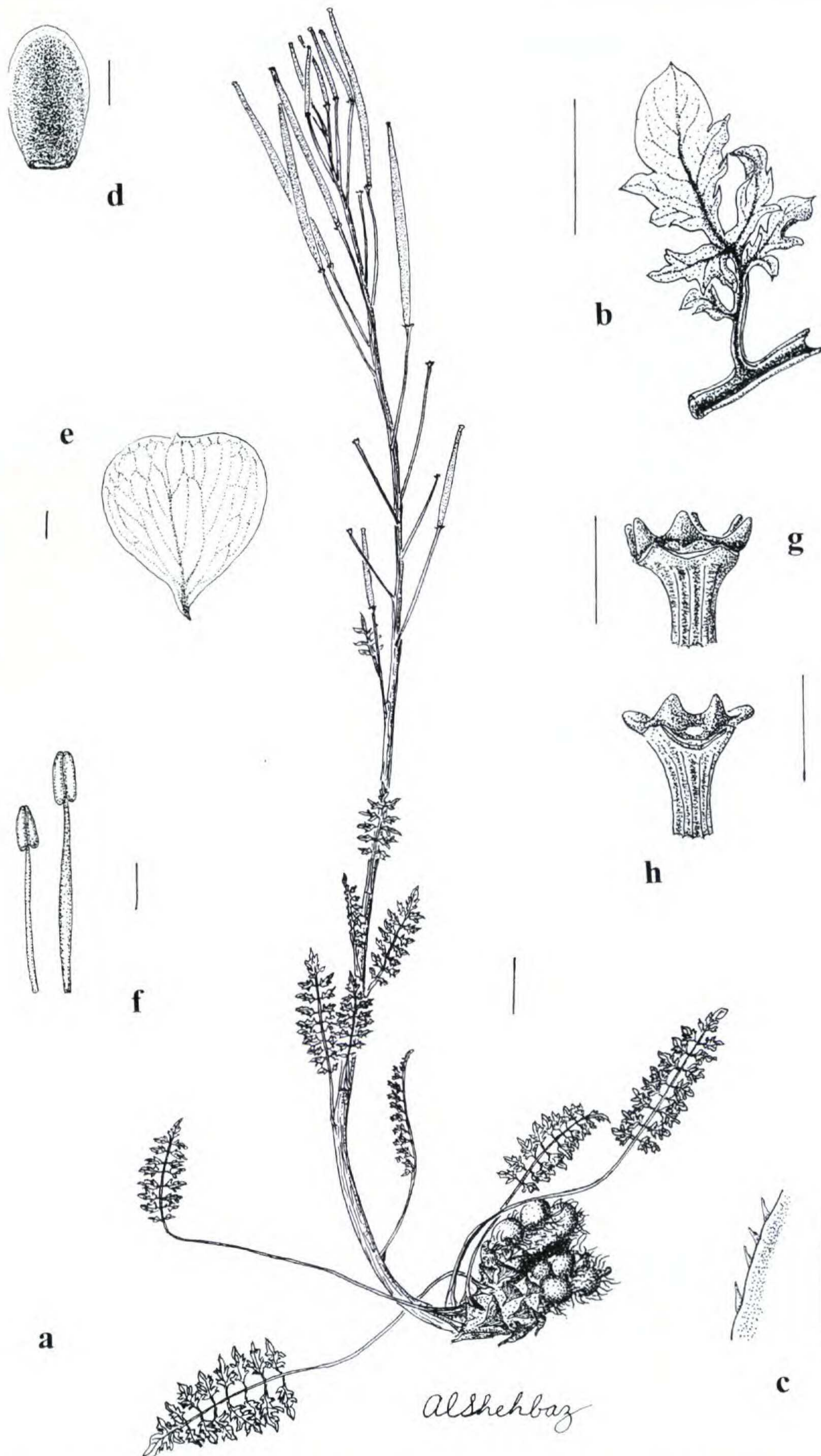


Figure 1. a-h. *Cardamine lojanensis* Al-Shehbaz. —a. Plant. —b. Leaflet. —c. Portion of leaflet margin. —d. Sepal. —e. Petal. —f. Median (long) and lateral stamens. —g. Median view of nectar glands. —h. Lateral view of nectar glands. Figures a-c from Øllgaard *et al.* 58147, d-h from Øllgaard *et al.* 58037. Scale bars: a = 1 cm, b = 5 mm, c = 0.5 mm, d-h = 1 mm.



are adnate to pedicels. These differences are rather significant, and the new species is apparently unrelated to any of the tuberous species listed above.

A critical examination of the other South American *Cardamine* shows that *C. lojanensis* is more closely related to some of the perennial Ecuadorian and Colombian members of the genus, especially those that have pinnately compound basal leaves with petiolulate leaflets, large flowers with petals 8–18 mm long, and bracteate lower portions of the inflorescence. It is most closely related to *C. picta* Hooker (Colombia, Ecuador), *C. jamesonii* Hooker (Ecuador), and *C. obliqua* A. Rich. *Cardamine obliqua*, which includes *C. johnstonii* Oliver and *C. rhizomata* Rollins, is a highly variable species (Jonsell, 1982) distributed in tropical Africa, southern Central America, and northern South America (Rollins, 1993). From these three species, *C. lojanensis* is readily distinguished by its tuberous scaly rhizomes, basal leaves with 6–11 pairs of lateral leaflets, and minute trichomes only 0.06–0.12 mm long. In contrast, *C. picta*, *C. jamesonii*, and *C. obliqua* have slender rhizomes that are neither tuberous nor scaly, basal leaves with up to 5 pairs of lateral leaflets, and leaves glabrous or with trichomes that are much longer.

The boundaries between several of the South American species of *Cardamine* are difficult to define, and the genus is badly in need of a critical revision. Schulz (1903) recognized in South America as many as 27 species with 28 additional infraspecific taxa, whereas Gilg and Muschler (1909)

recognized 23 species with 32 additional infraspecific taxa. The opposite extreme was taken by Sjöstedt (1975), who reduced the 97 species described from Central and South America to only 5 and basically ignored the tremendous amount of diversity among the Latin American *Cardamine*. There are at least 30 well-defined species in South America (Al-Shehbaz, 1988), but most of the infraspecific taxa recognized by Schulz (1903) and Gilg and Muschler (1909) can be reduced to synonymy.

*Paratypes.* ECUADOR. **Loja** (all localities in Parque Nacional Podocarpus): Cerro Toledo, 3350 m, 79°7'W 4°23'S, Madsen, Bloch & Christensen 75664 (AAU); Cerro Toledo, E of Yangana, 3300–3450 m, 79°6'W 4°24'S, Øllgaard, Laegaard, Thomsen, Korning & Illum 58037 (AAU); Cerro Toledo, 79°20'W 4°23'S, 3000–3400 m, Madsen, Bergman & Pedersen 86117 (AAU).

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#### Literature Cited

- Al-Shehbaz, I. A. 1988. The genera of Arabideae (Cruciferae; Brassicaceae) in the southeastern United States. *J. Arnold Arbor.* 69: 85–166.
- Gilg, E. & R. Muschler. 1909. Aufzählung aller zur Zeit Bekannten südamerikanischen Cruciferen. *Bot. Jahrb. Syst.* 42: 437–487.
- Jonsell, B. 1982. Cruciferae. *In:* R. M. Polhill (editor), *Fl. Tropical East Africa*. Rotterdam.
- Rollins, R. C. 1993. *The Cruciferae of Continental North America*. Stanford Univ. Press, Stanford.
- Schulz, O. E. 1903. Monographie der Gattung *Cardamine*. *Bot. Jahrb. Syst.* 32: 280–623.
- Sjöstedt, B. 1975. Revision of the genus *Cardamine* L. (Cruciferae) in South and Central America. *Bot. Not.* 128: 8–19.